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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Richard B. Peterson

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EXAMINER

ECHELMEYER, ALIX ELIZABETH

ART UNIT

PAPER NUMBER

1745

MAIL DATE

DELIVERY MODE

10/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/677,427

Applicant(s)

PETERSON, RICHARD B.

Examiner

Alix Elizabeth Echelmeyer

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 21-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 28-30 is/are allowed.
- 6) ☒ Claim(s) 1-15 and 22 is/are rejected.
- 7) ☒ Claim(s) 21 and 23-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed July 11, 2007. Claims 1, 3, 6, 9-13 and 15 have been amended. Claims 21-30 have been added. Claims 16-20 were cancelled previously. Claims 1-15 and 22 are rejected for the reasons given below. Claims 21 and 23-27 are objected to. Claims 28-30 are allowed for the reasons given below.

Claim Objections

2. Claims 21 and 23-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jankowski et al. (US Pre-Grant Publication 2004/0072039) in view of Fuglevand et al. (US Pre-Grant Publication 2002/0031692) and Zafred et al. (US 6,221,522).

Regarding claims 1, 2, 8-13 and 15, Jankowski et al. teach a miniaturized solid-oxide fuel cell system (abstract, [0003]). The system includes a counter flow heat exchanger, catalytic combustor and exhaust vent ([0044], [0045]). As in the fuel cell system is a fuel inlet and an oxidant inlet (Figure 1, [0035]).

As for claims 3 and 13, Jankowski et al. further teach that the fuel cell system is thermally isolated, for example using aerogel, vacuum packaging, or a combination of these, to minimize heat conduction [0075]). In order to create thermal isolation, the packaging would have to be sealed to prevent heat from escaping, especially since solid oxide fuel cells are well known to operate at very high temperatures.

Regarding claim 4, the power generated by the fuel cell is seen in Figure 4.

As for claim 5, the fuel cell is powered by hydrogen ([0021]).

Concerning claim 7, Jankowski et al. teach the catalytic combustor would inherently create heat, since heat is a byproduct of a catalytic reaction.

As for claim 14, Jankowski et al. teach that the system is miniature but do not provide a size range. It would have been obvious to one having ordinary skill in the art at the time the invention was made to determine the size most appropriate for the desired application since, in portable systems, it is desirable to keep size and weight at a minimum ([0066]). It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. MPEP 2144.04 (A)

Jankowski et al. fail to teach that the fuel cell system is plug-compatible.

Fuglevand et al. teach a fuel cell system that contains removable fuel cells (Figure 3, [0071]-[0078]).

Fuglevand et al. further teach that it is desirable to make the fuel cells removable in order to facilitate repair ([0006]).

It would be advantageous to make the fuel cell system of Jankowski et al. plug compatible as taught by Fuglevand et al. since it would make the system removable in case the need to repair the system arose.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the fuel cell system of Jankowski et al. plug compatible as taught by Fuglevand et al. since it would make the system removable in case the need to repair the system arose.

Jankowski et al. in view of Fuglevand et al. fail to teach that the air inlet, fuel inlet, electrode connector, and exhaust outlet are all located within the plug connector.

Zafred et al. teach a solid oxide fuel cell contained within a sealed housing, wherein the fuel and oxidant enter on the same end as the exhaust is released (Figure 1, column 3 lines 20-23).

Regarding claims 6 and 9, the housing of Zafred et al. is made of a thermally shock resistant metal, such as alloy steel (column 3 lines 16-20).

The housing of Zafred et al. is advantageous because it protects the inside elements, such as the air electrode, from degradation during operation and under upset conditions (column 2 lines 5-9).

One of ordinary skill in the art would recognize that, by placing the electrode, reactant inlets, and exhaust together, such as in the plug of Fuglevand et al., the housing would be more effective since the walls not containing the inlets, outlet or electrodes would be solid and less susceptible to damage.

It would be advantageous to use the housing and arrangement of electrodes, inlets and exhaust taught by Zafred et al. in the fuel cell system of Jankowski et al. in view of Fuglevand et al. since it would protect the elements of the fuel cell system within the housing.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the housing and arrangement of electrodes, inlets and exhaust taught by Zafred et al. in the fuel cell system of Jankowski et al. in view of Fuglevand et al. since it would protect the elements of the fuel cell system within the housing.

5. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jankowski et al. in view of Fuglevand et al. and Zafred et al. as applied to claim 1 above, and further in view of Armstrong et al. (US 6,682,841).

The teachings of Jankowski et al., Fuglevand et al. and Zafred et al. as discussed above are incorporated herein.

Jankowski et al. in view of Fuglevand et al. and Zafred et al. teach the thermally insulated plug-compatible system of the instant invention but fail to teach that the system is thermally insulated by vacuum multi-foil insulation.

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Armstrong et al. teach a thermally insulated solid oxide fuel cell system (column 1 lines 47-59).

Armstrong et al. teach that vacuum foil insulation having solid walls with a vacuum between may be used to insulate the fuel cell system (column 4 lines 22-36, 50-51).

The vacuum taught by Armstrong et al. impedes conductive and convective heat transfer from the fuel cell to the environment (column 4 lines 52-58). Therefore, there are two insulating envelopes with a vacuum formed in between.

It would be advantageous to use the vacuum foil insulation of Armstrong et al. in the fuel cell system of Jankowski et al. in view of Fuglevand et al. and Zafred et al. since it impedes conductive and convective heat transfer from the fuel cell to the environment.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the vacuum foil insulation of Armstrong et al. in the fuel cell system of Jankowski et al. in view of Fuglevand et al. and Zafred et al. since it impedes conductive and convective heat transfer from the fuel cell to the environment.

Allowable Subject Matter

6. Claims 28-30 are allowed.

7. The following is an examiner's statement of reasons for allowance: Claims 28-30 are allowed because they contain subject matter not taught in the prior art. The limitations to a first and second envelope surrounding a solid oxide fuel cell, with the

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envelopes made of quartz or glass and having an insulating space between the envelopes, is not taught.

8. Claims 6, 9, 21 and 23-27 contain allowable subject matter.

9. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach a quartz envelope for containing a solid oxide fuel cell system, or a second quartz insulating envelope within the first envelope.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

10. Applicant's arguments with respect to the rejection of claims 6 and 9 under Jankowski et al. in view of Fuglevand et al. have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. Since Applicant had elected the species of quartz as the envelope material, that species has been found allowable, see above. However, the examiner has rejected these claims over the species of metal, under the new grounds of rejection over Zafred et al.

Affidavit

11. The Affidavit filed by Applicant on July 11, 2007 has been considered by the examiner. The examiner is convinced that aerogel does not contain quartz based on the provided "Science Lab.com" reference. This reference states that aerogel based on silica is synthetic amorphous silica, and should "not be confused with crystalline silica such as quartz ...".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1745

aee


SUSYTSANG-FOSTER
PRIMARY EXAMINER